STATE OF CONNECTICUT
DEPARTMENT OF TRANSPORTATION

2800 BERLIN TURNPIKE, P.O. BOX 317546
NEWINGTON, CONNECTICUT 06131-7546

Phone: 860-594-3128

November 16, 2015

Subject: Project No. 87-142
Rehabilitation of Bridge No. 00596 Route 68 over Route 8, S.R. 710 Metro North Railroad & Naugatuck River in the town of Naugatuck.

NOTICE TO CONTRACTORS:

This is to notify all concerned and especially the prospective bidders that the bid opening for the subject project was previously postponed to November 25, 2015 at 2:00 P.M. in the Conference Room of the Department of Transportation Administration Building, 2800 Berlin Turnpike, Newington, Connecticut.

Addendum No. 1 is attached and can also be obtained on the Statewide Contracting Portal at http://www.biznet.ct.gov/scp_search/BidResults.aspx?groupid=64

This addendum is necessary to revised contract documents.

Bid Proposal Forms (0087-0142.EBS file and amendment file 0087-0142.00# if applicable) are available for those bidders that have received approval from the Department to bid on the subject project

Pre-Bid Questions and Answers: Questions pertaining to DOT advertised construction projects must be presented through the CTDOT Pre-Bid Q and A Website. The Department cannot guarantee that all questions will be answered prior to the bid date. **PLEASE NOTE - at 12:01 am, the day before the bid, the subject project(s) being bid will be removed from the Q and A Website, Projects Advertised Section, at which time questions can no longer be submitted through the Q and A Website. At this time, the Q and A for those projects will be considered final, unless otherwise stated and/or the bid is postponed to a future date and time to allow for further questions and answers to be posted.**

Philip J. Melchionne
For: Gregory D. Straka
Contracts Manager
Division of Contracts Administration

NOVEMBER 16, 2015

REHABILITATION OF BRIDGE NO. 00596 ROUTE 68 OVER ROUTE 8, S.R. 710, METRO-NORTH RAILROAD AND NAUGATUCK RIVER

STATE PROJECT NO. 0087-0142
TOWN OF NAUGATUCK

ADDENDUM NO. 1

This Addendum addresses the following questions and answers contained on the "CT DOT QUESTIONS AND ANSWERS WEBSITE FOR ADVERTISED CONSTRUCTION PROJECTS":

Question and Answer Nos. 3, 4, 5, 8, 9, 10, 13, 14, 18, 19 and 20

SPECIAL PROVISIONS

NEW SPECIAL PROVISIONS

The following Special Provisions are hereby added to the Contract:

- NOTICE TO CONTRACTOR – UTILITY GENERATED SCHEDULE
- ITEM NO. 0406275A – FINE MILLING OF BITUMINOUS CONCRETE (0" TO 4")
- ITEM NO. 0601070A – CLASS "S" CONCRETE

REVISED SPECIAL PROVISIONS

The following Special Provisions are hereby deleted in their entirety and replaced with the attached like-named Special Provisions:

- ITEM NO. 0503001A – REMOVAL OF SUPERSTRUCTURE
- ITEM NO. 0601954A – EPOXY INJECTION CRACK REPAIR
- ITEM NO. 0913014A – 5' CHAIN LINK FENCE (BRIDGE)
- ITEM NO. 0913955A – PROTECTIVE FENCE (7' HIGH)(CURVED)

CONTRACT ITEMS

NEW CONTRACT ITEMS

ITEM NO.	DESCRIPTION	UNIT	QUANTITY
0406275A	FINE MILLING OF BITUMINOUS CONCRETE (0" TO 4")	SY	3, 155

REVISED CONTRACT ITEMS

ITEM NO.	DESCRIPTION	ORIGINAL QUANTITY	REVISED QUANTITY
0406277A	REMOVAL OF EXISTING WEARING SURFACE	3,340 SY	315 SY
0601201	CLASS "F" CONCRETE	1,340 CY	1,424 CY
0714050A	TEMPORARY EARTH RETAINING SYSTEM	1,640 SF	175 SF
1301454A	12" DUCTILE IRON BEND	4 EA	6 EA

DELETED CONTRACT ITEM(S)

ITEM NO.	DESCRIPTION	ORIGINAL QUANTITY	REVISED QUANTITY
0601000	CLASS "A" CONCRETE	84 CY	0
0603467	TEMPORARY SLAB SUPPORT (SITE NO. 1)	1 LS	0

PLANS

REVISED PLANS

The following Plan Sheets are hereby deleted and replaced with the like-numbered Plan Sheets:

02.02.A1
04.02.A1
04.04.A1
04.09.A1
04.23.A1
04.34.A1
04.35.A1
04.37.A1

The Detailed Estimate Sheet does not reflect these changes.

The Bid Proposal Form has been revised to reflect these changes.

There will be no change in the number of calendar days due to this Addendum.

The foregoing is hereby made a part of the contract.

NOTICE TO CONTRACTOR – UTILITY GENERATED SCHEDULE

The attached project specific utility work schedules were provided to the Connecticut Department of Transportation (Department) by the utility companies regarding their identified work on this project.

The utility scheduling information is provided to assist the Contractor in scheduling its activities. However, the Department does not ensure its accuracy and Section 1.05.06 of the Standard Specifications still is in force.

The utility scheduling information shall be incorporated into the Contractor's pre-award schedule in accordance with the Department's Bidding and Award Manual and Section 1.05.08 of the Contract.

After award, the Contractor shall conduct a utility coordination meeting or meetings to obtain contemporaneous scheduling information from the utilities prior to submitting its baseline schedule to the Department in accordance with Section 1.05.08 of the Contract.

The Contractor shall incorporate the contemporaneous utility scheduling information into its baseline schedule submittal. The baseline schedule shall include Contractor predecessor and successor activities to the utility work in such detail as acceptable to the Engineer.

rev. 5/20/2013	UTILITY WORK SCHEDULE		
CTDOT Project Number:	87-142	Town:	Naugatuck
Project Description:	Repair of Bridge 596 Route 68 overNaugauck river		
CTDOT Utilities Engineer:	Lesgie Ruiz		
Phone:		Email:	
Utility Company:	Comcast of CT/GA/MA/NH/NY/NC/VA/VT,LLC		
Prepared By:	Dave Gerrish	Date Prepared:	9/14/2015
Phone:	203-732-0146 x73801	Email:	dave_gerrish@cable.comcast.com

Scope of Work

The following is a description of all utility work planned to be completed in conjunction with the CTDOT project. The narrative describes all work to be carried out by the utility or its contractor, including temporary and permanent work required by the project as well as any additional utility infrastructure work the utility intends on performing within the project limits during the construction of the project.

Comcast has a total of 4 cables running on the poles within this construction project. Two of them being Coax and two or them are Fiber Optic and these all run on one attachment point at each pole. Comcast will need to place new 1/4" Strand along the new proposed aerial route and place new coax cable. Upon the completion of the coax cable being run and cutover, new fiber cable will need to be overlashed to the coax and spliced in . Upon completion of the fiber relocation, all old facilities will be removed.

Special Considerations and Constraints

The following describes the limiting factors that must be planned for in the scheduling and performance of the utility work. For example, restrictions on cut-overs, outages, limitations on customer service interruptions (e.g. nights, weekends, holidays), seasonal and environmental shutdown periods, long lead material procurements, etc..

All Eversource work will need to be 100% completed before Comcast can begin our reconstruction. Police detail will need to be scheduled and present for all Comcast work. Cutover of new facilities will need to be completed before 8:00AM on day of cutover which will need to fall between Tuesday and Thursday of the week of construction. The Fiber Optic cutover will require a 3 week notification in advance due to the fact that other carriers besides Comcast utilizes this fiber and will need to be notified of the outage.

UTILITY WORK SCHEDULE

CTDOT Project Number: 87-142

Utility Company: Comcast of CT/GA/MA/NH/NY/NC/VA/VT,LLC

Prepared By: Dave Gerrish   Total Calendar Days: 5.5

Schedule

The following schedule identifies each major activity of utility work in sequential order to be performed by the utility or its contractor. The location of each activity of work is identified by the baseline stationing on the CTDOT plans. All activities identify the predecessor activity which must be completed before a utility work activity may progress. The duration provided is the number of calendar days required to complete the utility work activity based on historical information and production rates.

Location (Station to Station)	Description of Utility Work Activity	Predecessor Activity	Duration (calendar days)
Golden Ct and Union St	Place new 1/4" strand and place new coax cable to new poles	New poles in place and Eversource work 100% complete	1
Golden Ct and Union St	Cold splice all new coax cables	New poles in place and Eversource work 100% complete	0.5
Golden Ct and Union St	Activate new cable and Cutover all customers within the project area.	New cables have been run	1
Entire project area	Overlash new Fiber Optic cable to newly relocated strand and coax cable.	Coax cable cutover.	1
Entire project area	Splice fiber and cutover.	Cutover of new coax cable complete	1
Entire project area	Wreck out all old facilities off old poles. (N. Main St.)	Cutover of new coax cable and Fiber complete	1

UTILITY WORK SCHEDULE Rev 3/2015			
CTDOT Project Number:	87-142	Town:	Naugatuck
Project Description:	Bridge 00596 - Prospect St, Rte 68 over Rte 8		
CTDOT Utilities Engineer:	Tom Mangan		
Phone: 860-563-9375		Email:	TMangan@cjmpc.com
Utility Company:	Eversource		
Prepared By:	Alfreda Mikulak	Date Prepared:	07/07/2015
Phone:	203-597-4239	Email:	alfreda.mikulak@eversource.com

Scope of Work

The following is a description of all utility work planned to be completed in conjunction with the CTDOT project. The narrative describes all work to be carried out by the utility or its contractor, including temporary and permanent work required by the project as well as any additional utility infrastructure work the utility intends on performing within the project limits during the construction of the project.

The existing 13F65/13F71 double cicuit pole line along N. Main St, which currently passes over the bridge and taps off along the south side of the bridge from existing pole E1, will be relocated along Golden Ct from the intersection of N. Main St, up to and across Prospect St/Rte 68, and then down along Union St back to N. Main St. Existing conductors passing over the bridge will be removed, and supporting poles E1 and F617 will removed, or replaced to maintain existing municipal lights on N Main St. As an option, pole 64117 may be re-utilized as a streetlight pole vs. resetting pole E1, but all guying to be removed from 64117. Associated work: removal of a switch at pole E3, to be replaced by 600A cutouts at pole E4; two 3-ph transformer banks to be transferred from 13F71 to 13F65 at 64118, and from 7274 to 9388; setting 15 new or replaced poles, and 19 anchors; and, tree trimming to accommodate new poles.

Special Considerations and Constraints

The following describes the limiting factors that must be planned for in the scheduling and performance of the utility work. For example, restrictions on cut-overs, outages, limitations on customer service interruptions (e.g. nights, weekends, holidays), seasonal and environmental shutdown periods, long lead material procurements, etc..

Work associated with transformer banks on poles 64118 and 7274 will involve service interruption to customers; individual circumstances may require scheduling night/weekend work. Inclement weather may cause a delay in the schedule. Lead time for orders of H1 class poles is forecast to be about 8 weeks.

UTILITY WORK SCHEDULE Rev 3/2015

CTDOT Project Number: 87-142

Utility Company: Eversource

Prepared By: Alfreda Mikulak — Total Working Days: 80

Schedule

The following schedule identifies each major activity of utility work in sequential order to be performed by the utility or its contractor. The location of each activity of work is identified by the baseline stationing on the CTDOT plans. All activities identify the predecessor activity which must be completed before a utility work activity may progress. The duration provided is the number of working days required to complete the utility work activity based on historical information and production rates.

Location (Station to Station)	Description of Utility Work Activity	Predecessor Activity	Duration (working days)
PROJECT	Order material, including poles; schedule crews. Request tree trim.	Formal notification from State for CL&P to proceed with construction.	40
PROJECT	Contact CBYD; set 15 poles and 19 anchors.	Delivery of poles	10
PROJECT	Build new pole line.	Tree trim and pole sets.	15
PROJECT	Run new conductors, transfer existing facilities as required.	New poles in place.	7
PROJECT	Remove switch at E3, install cutouts at E4, shift 3-ph transformer banks to new feeder locations	Switching orders; pole set, arrange interruption with affected customers.	3
PROJECT	Remove old conductors from over bridge and from poles to be removed. Relocate municipal streetlights	New pole line and feeders in place.	3
PROJECT	Remove old poles.	All conductors removed, other utilities removed or shifted..	2

rev. 5/20/2013

UTILITY WORK SCHEDULE

CTDOT Project Number:	87-142	Town:	Naugatuck
Project Description:	Reconstruction of Route 68 Prospect St Bridge No. 0596		
CTDOT Utilities Engineer:	Close, Jensen and Miller, P.C.		
Phone:	(860) 563-9375	Email:	
Utility Company:	Eversource Gas		
Prepared By:	Edward Flanagan	Date Prepared:	8/3/2015
Phone:	(203) 596-3023	Email:	edward.flanagan@eversource.com

Scope of Work

The following is a description of all utility work planned to be completed in conjunction with the CTDOT project. The narrative describes all work to be carried out by the utility or its contractor, including temporary and permanent work required by the project as well as any additional utility infrastructure work the utility intends on performing within the project limits during the construction of the project.

Relocate / replace existing 6 inch steel gas main: (1.) Cut off, purge out of service and abandon in place the existing 6 inch steel gas pipe on Bridge 0596. (2.) Install permanent gas main on new structure. (3.) Tie-in and energized permanent gas main.

Special Considerations and Constraints

The following describes the limiting factors that must be planned for in the scheduling and performance of the utility work. For example, restrictions on cut-overs, outages, limitations on customer service interruptions (e.g. nights, weekends, holidays), seasonal and environmental shutdown periods, long lead material procurements, etc..

UTILITY WORK SCHEDULE

CTDOT Project Number: 87-142

Utility Company: EVERSOURCE GAS

Prepared By: EDWARD FLANAGAN Total Calendar Days: 28

Schedule

The following schedule identifies each major activity of utility work in sequential order to be performed by the utility or its contractor. The location of each activity of work is identified by the baseline stationing on the CTDOT plans. All activities identify the predecessor activity which must be completed before a utility work activity may progress. The duration provided is the number of calendar days required to complete the utility work activity based on historical information and production rates.

Location (Station to Station)	Description of Utility Work Activity	Predecessor Activity	Duration (calendar days)
10+50 to 16+50	Cut off, purge out of service and abandon in place existing 6" steel gas main on bridge.	None	3
10+50 to 20+50	Install permanent gas main	Cut off and abandon 6 inch existing gas main	21
10+50 to 20+50	Tie-in and energize permanent gas main	Installation of 6 inch permanent gas main	4

rev. 5/20/2013	UTILITY WORK SCHEDULE		
CTDOT Project Number:	SHP 87-142	Town:	NAUGATUCK, CT
Project Description:	BRIDGE # 00596 RECONSTRUCTION, RT 68 , PROSPECT ST		
CTDOT Utilities Engineer:	Thomas Mangan, CJM		
Phone: 860-563-9375		Email:	Tmangan@cjmpc.com
Utility Company:	Fibertech Networks		
Prepared By:	Raymond Soma	Date Prepared:	8/11/2015
Phone: 860-643-4365		Email:	rsoma@fibertech.com

Scope of Work

The following is a description of all utility work planned to be completed in conjunction with the CTDOT project. The narrative describes all work to be carried out by the utility or its contractor, including temporary and permanent work required by the project as well as any additional utility infrastructure work the utility intends on performing within the project limits during the construction of the project.

Fibertech's work will consist of rerouting a 96F cable to accommodate the reconstruction of Bridge 00596 on RT 68 Prospect St

Special Considerations and Constraints

The following describes the limiting factors that must be planned for in the scheduling and performance of the utility work. For example, restrictions on cut-overs, outages, limitations on customer service interruptions (e.g. nights, weekends, holidays), seasonal and environmental shutdown periods, long lead material procurements, etc..

N/A

UTILITY WORK SCHEDULE

CTDOT Project Number: SHP 87-142

Utility Company: Fibertech Networks

Prepared By: Raymond Soma Total Calendar Days: 10

Schedule

The following schedule identifies each major activity of utility work in sequential order to be performed by the utility or its contractor. The location of each activity of work is identified by the baseline stationing on the CTDOT plans. All activities identify the predecessor activity which must be completed before a utility work activity may progress. The duration provided is the number of calendar days required to complete the utility work activity based on historical information and production rates.

Location (Station to Station)	Description of Utility Work Activity	Predecessor Activity	Duration (calendar days)
Union St	Place cable to provide for reroute	CATV to complete work	4
Main St	Splice cable	N/A	2
Main St	Remove cable	N/A	4

rev. 5/20/2013	UTILITY WORK SCHEDULE	
CTDOT Project Number:	87-142	Town: Naugatuck
Project Description:	Rehabilition of RT 68 bridge over RT 8	
CTDOT Utilities Engineer:	Derek Brown	
Phone:		Email:
Utility Company:	Frontier Communications	
Prepared By:	Gary Swanson	Date Prepared:
Phone:	203-575-6112	Email: gary.k.swanson@ftr.com

Scope of Work

The following is a description of all utility work planned to be completed in conjunction with the CTDOT project. The narrative describes all work to be carried out by the utility or its contractor, including temporary and permanent work required by the project as well as any additional utility infrastructure work the utility intends on performing within the project limits during the construction of the project.

Frontier has one pole to replace and shift cable and equipment to new pole. We also have to move cables at various poles the Eversource are replacing.

Special Considerations and Constraints

The following describes the limiting factors that must be planned for in the scheduling and performance of the utility work. For example, restrictions on cut-overs, outages, limitations on customer service interruptions (e.g. nights, weekends, holidays), seasonal and environmental shutdown periods, long lead material procurements, etc..

UTILITY WORK SCHEDULE

CTDOT Project Number: 87-142

Utility Company: Frontier Commincations

Prepared By: Gary Swanson   Total Calendar Days: 8

Schedule

The following schedule identifies each major activity of utility work in sequential order to be performed by the utility or its contractor. The location of each activity of work is identified by the baseline stationing on the CTDOT plans. All activities identify the predecessor activity which must be completed before a utility work activity may progress. The duration provided is the number of calendar days required to complete the utility work activity based on historical information and production rates.

Location (Station to Station)	Description of Utility Work Activity	Predecessor Activity	Duration (calendar days)
Golden Ct	replace P-1103 and shift cables.	Eversource needs to set their poles and we will follow.	3
Various locations	Shift service wire to new poles.	After CATV shifts	5

ITEM #0406275A - FINE MILLING OF BITUMINOUS CONCRETE (0" TO 4")

Description: This work shall consist of the milling, removal, and disposal of existing bituminous concrete pavement.

Construction Methods: The Contractor shall remove the bituminous concrete material using means acceptable to the Engineer. The pavement surface shall be removed to the line, grade, and existing or typical cross-section shown on the plans or as directed by the Engineer.

The bituminous concrete material shall be disposed of offsite by the Contractor at an approved disposal facility unless otherwise stated in the Contract.

Any milled surface, or portion thereof, that is exposed to traffic shall be paved within five (5) calendar days unless otherwise stated in the plans or Contract.

The equipment for milling the pavement surface shall be designed and built for milling bituminous concrete pavements. It shall be self propelled with sufficient power, traction, and stability to maintain depth and slope and shall be capable of removing the existing bituminous concrete pavement.

The milling machine shall be equipped with a built-in automatic grade averaging control system that can control the longitudinal profile and the transverse cross-slope to produce the specified results. The longitudinal controls shall be capable of operating from any longitudinal grade reference, including string line, contact ski (30 feet minimum), non-contact ski (20 feet minimum), or mobile string line (30 feet minimum). The transverse controls shall have an automatic system for controlling cross-slope at a given rate. The Engineer may waive the requirement for automatic grade or slope controls where the situation warrants such action.

The machine shall be able to provide a 0 to 4 inch deep cut in one pass. The rotary drum of the machine shall use carbide or diamond tipped tools spaced not more than $^{5}/_{16}$ inch apart. The forward speed of the milling machine shall be limited to no more than 45 feet/minute. The tools on the revolving cutting drum must be continually maintained and shall be replaced as warranted to provide a uniform pavement texture.

The machine shall be equipped with an integral pickup and conveying device to immediately remove material being milled from the surface of the roadway and discharge the millings into a truck, all in one operation. The machine shall also be equipped with a means of effectively limiting the amount of dust escaping from the milling and removal operation.

When milling smaller areas or areas where it is impractical to use the above described equipment, the use of a lesser equipped milling machine may be permitted when approved by the Engineer.

Protection shall be provided around existing catch basin inlets, manholes, utility valve boxes, and any similar structures. Any damage to such structures as a result of the milling operation is the Contractor's responsibility and shall be repaired at the Contractor's expense.

To prevent the infiltration of milled material into the storm drainage system, the Contractor shall take special care to prevent the milled material from falling into the inlet openings or inlet grates. Any milled material that has fallen into inlet openings or inlet grates shall be removed at the Contractor's expense.

Surface Tolerance: The milled surface shall provide a satisfactory riding surface with a uniform textured appearance. The milled surface shall be free from gouges, longitudinal grooves and ridges, oil film, and other imperfections that are a result of defective equipment, improper use of equipment, or poor workmanship. The Contractor, under the direction of the Inspector, shall perform random spot-checks with a Contractor supplied ten-foot straightedge to verify surface tolerances at a minimum of five (5) locations per day. The variation of the top of two ridges from the testing edge of the straightedge, between any two ridge contact points, shall not exceed ¼ inch. The variation of the top of any ridge to the bottom of the groove adjacent to that ridge shall not exceed ¼ inch. Any unsatisfactory surfaces produced are the responsibility of the Contractor and shall be corrected at the Contractor's expense and to the satisfaction of the Engineer.

The depth of removal will be verified by taking measurements every 250 feet per each pass of the milling machine, or as directed by the Engineer. These depth measurements shall be used to monitor the average depth of removal.

Where a surface delamination between bituminous concrete layers or a surface delamination of bituminous concrete on Portland cement concrete causes a non-uniform texture to occur, the depth of milling shall be adjusted in small increments to a maximum of +/- ½ inch to eliminate the condition.

When removing bituminous concrete pavement entirely from an underlying Portland cement concrete pavement, all of the bituminous concrete pavement shall be removed leaving a uniform surface of Portland cement concrete, unless otherwise directed by the Engineer.

Any unsatisfactory surfaces produced by the milling operation are the Contractor's responsibility and shall be corrected at the Contractor's expense and to the satisfaction of the Engineer.

No vertical faces, transverse or longitudinal, shall be left exposed to traffic unless the requirements below are met. This shall include roadway structures (catch basins, manholes, utility valve boxes, etc.). If any vertical face is formed in an area exposed to traffic, a temporary paved transition shall be established according to the requirements shown on the plans. If the milling machine is used to form a temporary transition, the length of the temporary transition shall conform to Special Provision Section 4.06 –Bituminous Concrete, "Transitions for Roadway Surface," the requirements shown on the plans, or as directed by the Engineer. At all

permanent limits of removal, a clean vertical face shall be established by saw cutting prior to paving.
Roadway structures shall not have a vertical face of greater than one (1) inch exposed to traffic as a result of milling. All structures within the roadway that are exposed to traffic and greater than one (1) inch above the milled surface shall receive a transition meeting the following requirements:

For roadways with a posted speed limit of 35 mph or less*:

1. Round structures with a vertical face of greater than 1 inch to 2.5 inches shall be transitioned with a hard rubber tapered protection ring of the appropriate inside diameter designed specifically to protect roadway structures.

2. Round structures with a vertical face greater than 2.5 inches shall receive a transition of bituminous concrete formed at a minimum 24 to 1 (24:1) taper in all directions.

3. All rectangular structures with a vertical face greater than 1 inch shall receive a transition of bituminous concrete formed at a minimum 24 to 1 (24:1) taper in all directions.

*Bituminous concrete tapers at a minimum 24 to 1 (24:1) taper in all directions may be substituted for the protection rings if approved by the Engineer.

For roadways with a posted speed limit of 40, 45 or 50 mph:

1. All structures shall receive a transition of bituminous concrete formed at a minimum 36 to 1 (36:1) taper in the direction of travel. Direction of travel includes both the leading and trailing side of a structure. The minimum taper shall be 24 to 1 (24:1) in all other directions.

For roadways with a posted speed limit of greater than 50 mph:

1. All structures shall receive a transition of bituminous concrete formed at a minimum 60 to 1 (60:1) taper in the direction of travel. Direction of travel includes both the leading and trailing side of a structure. The minimum taper shall be 24 to 1 (24:1) in all other directions.

All roadway structure edges and bituminous concrete tapers shall be clearly marked with fluorescent paint. The paint shall be maintained throughout the exposure to traffic.

The milling operation shall proceed in accordance with the requirements of the “Maintenance and Protection of Traffic” and “Prosecution and Progress” specifications, or other Contract requirements. The more stringent specification shall apply.

Prior to opening an area which has been milled to traffic, the pavement shall be thoroughly swept with a sweeper truck. The sweeper truck shall be equipped with a water tank and be capable of

removing the millings and loose debris from the surface. The sweeper truck shall operate at a forward speed that allows for the maximum pickup of millings from the roadway surface. Other sweeping equipment may be provided in lieu of the sweeper truck where acceptable by the Engineer.

Any milled area that will not be exposed to live traffic for a minimum of 48 hours prior to paving shall require a vacuum sweeper truck in addition to, or in lieu of, mechanical sweeping. The vacuum sweeper truck shall have sufficient power and capacity to completely remove all millings from the roadway surface including any fine particles within the texture of the milled surface. Vacuum sweeper truck hose attachments shall be used to clean around pavement structures or areas that cannot be reached effectively by the main vacuum. Compressed air may be used in lieu of vacuum attachments if approved by the Engineer.

Method of Measurement: This work will be measured for payment by the number of square yards of area from which the milling of asphalt has been completed and the work accepted. No area deductions will be made for minor unmilled areas such as catch basin inlets, manholes, utility boxes and any similar structures.

Basis of Payment: This work will be paid for at the Contract unit price per square yard for "Fine Milling of Bituminous Concrete (0" to 4")." This price shall include all equipment, tools, labor, and materials incidental thereto.

No additional payments will be made for multiple passes with the milling machine to remove the bituminous surface.

No separate payments will be made for cleaning the pavement prior to paving; providing protection and doing handwork removal of bituminous concrete around catch basin inlets, manholes, utility valve boxes and any similar structures; repairing surface defects as a result of the Contractor's negligence; providing protection to underground utilities from the vibration of the milling operation; removal of any temporary milled or paved transition; removal and disposal of millings; furnishing a sweeper truck and sweeping after milling. The costs for these items shall be included in the Contract unit price.

Pay Item	Pay Unit
Fine Milling of Bituminous Concrete (0" to 4")	S.Y.

ITEM #0503001A – REMOVAL OF SUPERSTRUCTURE

Work under this item shall conform to the requirements of Section 5.03 of Form 816, amended as follows:

5.03.01 – Description: Add the following:
The work under this item shall include the removal of the bridge superstructure including parapet, fencing, sidewalk, utilities, wearing surface on the existing bridge, bridge deck, beams, and all other elements of the superstructure down to the beam seat.

The work under this item shall also include designing, furnishing, fabricating, erecting, maintaining, removing and disposing of debris shields at the locations shown on the Plans and/or as directed by the Engineer.

The debris shields shall provide for the safe passage of vehicles and pedestrians. The use of the debris shield is to ensure that no debris falls onto the roadway, sidewalks, railroad or river below the structure. The debris shields are to be used in conjunction with demolition activities.

5.03.02 – Materials: Add the following:
Steel and aluminum shall conform to the requirements of Section M.06 Metals.

Timber and hardware shall be as required by the Contractor's design. Timber material shall be structural lumber in accordance with the National Design Specifications for stress graded lumber recommended by the National Forest Products Association (NFPA). Plywood shall be exterior grade as outlined in the latest edition of Voluntary Product Standard PS 1-95 for Construction and Industrial Plywood of the American Plywood Association.

5.03.03 – Construction Methods: Add the following:

The existing superstructure shall be removed in stages, as shown on the Plans, to allow for the continued use of the adjacent roadway to maintain two lanes open to travel (except as noted in the contract documents) and to allow for the relocation and replacement of an existing in-service gas line and existing in-service water main, and maintenance of vehicular traffic.

Contractor shall remove a sufficient quantity of concrete from each diaphragm (part of the phased demolition activities) to expose the post-tensioning strands. The Contractor shall cut the strands so that there are sufficient lengths of exposed strand, provide jacking materials (i.e. centerhole/strand jacks, strand wedges, bearing plate, high strength grout, etc.), and tension existing post-tensioning strands to 20kips (minimum after losses). Each diaphragm has two such strands and they shall be tensioned at the same time and locked off prior to demolishing concrete at adjacent diaphragms. All elements of the jacking/load carrying system shall be designed by a Professional Engineer licensed in the State of Connecticut.

Removal operations shall be developed and performed in coordination with the Railroad so that railroad traffic through the site will not be adversely impacted. The Contractor shall develop and submit a comprehensive removal plan (signed and stamped by a Professional Engineer licensed in the State of Connecticut) to the Engineer and the Railroad for review and approval prior to beginning work.

All removal operations will be performed from the existing bridge deck or temporary structures supported by the existing piers (existing piers to remain). There are no permits nor anticipated use of the river for any demolition activities. Shielding or debris netting shall be used to contain demolition debris and prevent it from entering the river. Only solid shielding shall be used over vehicular or pedestrian traffic.

The debris shields for superstructure demolition shall meet or exceed the following requirements:

1. It shall be the Contractor's responsibility, as part of this item of work, to design and detail the debris shield to conform to all Federal, State, and Local laws and regulations, as well as the requirements contained here in this Specification.

2. The debris shield shall extend past the superstructure elements being removed. It shall extend past the edge of the deck in plan view and shall have a solid vertical shield a minimum height above the working surface of 3ft 6 inches.

3. The Contractor shall submit working drawings, stamped by a Professional Structural Engineer registered in the State of Connecticut, in accordance with Subsection 1.05.02; Plans, Working Drawings and Shop Drawings, of all proposed debris shielding to the Engineer for his review and approval prior to installation. The working drawings shall include design and details of the debris shield including all connections, brackets, and fasteners. The various components of the debris shield shall be designed for the anticipated weight of all personnel, material, equipment, and debris to be supported, based on the Contractor's method and sequence of work; environmental loads, including but not limited to wind; but in no case shall be designed for less than 100 pounds per square foot. Vertical elements of the debris shield shall be designed for anticipated loads and environmental loads, including but not limited to wind, or a minimum of 30 pounds per square foot, whichever is higher.

4. The debris shields shall be placed and secured against all applicable loads, including wind. If, in the opinion of the Engineer, the shields are not secure, the Contractor shall remove and install them to the satisfaction of the Engineer.

5. Debris shields shall be placed so as to prevent any demolition debris from falling or rolling down to the sidewalks/roadway below.

The debris shields shall not contain any gaps or openings that would allow debris to pass through, and shall be sufficiently strong to support any debris from falling into the river or onto the roadway or walkway below.

A limited number of weekend closures of the entire bridge and single lane closures with alternating one-way travel are permitted in accordance with provisions described elsewhere in these contract documents. Route 8 under Span 5 and Main Street under Span 6 shall only be halted for actual lifting operations directly over traffic lanes and shall be limited to no more than 10 minutes at a time as indicated elsewhere in the contract documents.

The demolition procedure shown in the plans is a suggested sequence. It is the Contractor's responsibility to design and submit its superstructure demolition procedure for review and approval by the Engineer.

1. Contractor shall design and submit a demolition procedure indicating size and locations of all equipment to be used and the effects of all demolition activities and equipment on the existing structure. The demolition procedure shall be signed and stamped by a Professional Engineer licensed in the State of Connecticut.

2. The Contractor is directed to the most current CTDOT Load Rating Report for the capacity of existing members. It is the Contractor's responsibility to verify the existing structural capacity for demolition procedure design.

3. The Contractor is notified that no provisions for working from the river are part of the project.

4. Span 2 demolition is over Metro North Railroad (MNRR). All lifting equipment (cranes, rigging, etc.,) used for the demolition of Span 2 shall be designed and sized with additional safety factor of 1.5 for the pick weights when compared to the chart values.

5. Limited access is available below span 2 over MNRR, all access and work shall be coordinated with MNRR.

5.03.04 - Method of Measurement: Delete the paragraph and replace with the following:

This work being paid for on a Lump Sum basis shall not be measured for payment. The Contractor shall submit a Schedule of Values to the Engineer for review and approval.

5.03.05 - Basis of Payment: Delete all paragraphs and replace with the following:

This work shall be paid for at the contract Lump Sum price for "Removal of Superstructure" complete, which price shall include all work called for herein including design, installation and removal of debris shields, jacking, removal and disposal of debris and all materials, equipment, tools and labor incidental thereto. Payment of the Lump Sum may be made in separate partial payments based on an agreed upon percentage of the total superstructure removed from site at the time of payment.

Pay Item	Pay Unit
Removal of Superstructure	L.S.

ITEM #0601070A - CLASS "S" CONCRETE

Work under this item shall conform to Section 6.01 of the Department Standard Specification, as supplemented and amended to provide for a Class "S" superplasticized concrete.

6.01.01 - Description: Add the following:

Class "S" Concrete may be used to fill and repair voids in horizontal and vertical surfaces of concrete areas greater than four square feet (4 sq. ft.) and/or where reinforcing steel has more than half of its surface area exposed as detailed on the Plans and/or as directed by the Engineer (exclusive of pavements).

Work under this item shall consist of removing loose concrete, deteriorated concrete, and concrete overlying hollow areas; patching these areas, as well as spalled and scaled areas with Class "S" Concrete formed to the original contour. The work shall also include sandblasting and cleaning areas to be patched and filled and replacement and priming of any exposed reinforcing steel prior to placing the concrete.

The Contractor shall not perform any repair work without prior approval of the Engineer for locations, limits and types of repairs.

6.01.02 - Materials: Add the following:

The single component zinc primer shall be one of the following:

Kolor-Zinc No. 0100
Manufactured by:
Keeler & Long, Inc.
856 Echo Lake Road
Watertown, CT 06795

Zinc Plate 49 Organic Primer
Manufactured by:
Con-Lux Coatings, Inc.
Talmadge Road, Box 847
Edison, NJ 08818

Carbozinc 11
Manufactured by:
Carboline
2150 Scheutz Road
St. Louis, MO 63146

Certification: A Materials Certificate and a Certificate of Compliance shall be required for the zinc primer in accordance with Article 1.06.07 of Form 816, certifying the conformance of this material to the requirements stated herein.

Materials shall conform to Section M.03 of the Department Standard Specification, as modified herein:

M.03.01 - General Composition of Concrete Mixes: is supplemented to include Class "S" superplasticized concrete.

Type	Proportions By Weight (Approx.)	Water Per Bag (Gallons), (Max.)	Cement Factor (Bags/Cu. Yd.)
Class "S"	1:2.16:2.20	5.7	7.0

1. Coarse Aggregate: is supplemented with the following:

(c) Grading: Coarse aggregate for the Class "S" Concrete shall meet the following gradation requirements:

For Class "S", the required grading shall be obtained by using 100% No. 8 coarse aggregate.

3. Cement: Add the following:

Type I or II Portland Cement shall be used for Class "S" Concrete and shall conform to the requirements of AASHTO M85.

9. Admixtures: is amended and supplemented as follows:

Delete Subarticle "(c) All other admixtures,…" in its entirety and substitute with the following:

(c) Superplasticizing Admixtures: The superplasticizer admixture shall be a high-range water reducer (HRWR) capable of increasing the slump of the mix from approximately 2.25" to 7" upon the addition of the amount recommended by the respective manufacturer. The HRWR shall conform to AASHTO M194, Type F or Type G and shall be approved by the Engineer. The use of this material shall be in strict accordance with the respective manufacturer's written instructions and procedures.

10. Curing Materials: is amended and supplemented as follows:

(c) Liquid Membrane-Forming Compound: Add the following:

No liquid membrane forming compound shall be used for Class "S" Concrete.

6.01.03 - Construction Methods: is supplemented with the following text.

Where this specification deviates from the Department Standard Specification, the intent of this text shall govern.

5. Composition: Add the following:

Class "S" Concrete shall conform to the requirements as specified in Article M.03.01 as amended

herein. Class "S" Concrete shall contain not less than 6.5 percent and not more than 8.5 percent entrained air at the time of placement.

The Class "S" Concrete shall have a minimum 3000 psi compressive strength at 28 days.

6. Consistency: Add the following:

Class "S" Concrete shall have a slump range of 2 to 4 inches prior to the addition of the HRWR and from 6 to 8 inch slump after the addition of the HRWR. The addition rates of the air entraining admixture and the HRWR will vary. Frequent field testing of the air content and slump prior to and after addition of the HRWR will be the determining factor of actual addition rates for each admixture.

7. Mixing Concrete: Add the following:

For hand mixing of Class "S" Concrete, the Contractor shall provide scale(s) approved by the Engineer in which cement and aggregate can be accurately weighed for the required mix proportions.

The Contractor shall also have measuring graduates marked in ounces for the proportioning of the A.E.A. and the HRWR. Do not mix the A.E.A. and the HRWR together before adding to the mix; the resultant solution will not work. Do not add the A.E.A. and the HRWR at the mixer simultaneously; these admixtures must be added separately in the mixing cycle. All manufactured materials shall be stored, mixed and used in strict accordance with the written recommendations of the respective manufacturers.

19. Curing Concrete: Add the following:

Concrete shall be cured by leaving forms on for seven (7) days and wetting them frequently.

Add the following subarticles:

25. Material Storage: The Contractor shall store and maintain the A.E.A. and the HRWR materials in clean original containers as delivered by the manufacturer.

26. Repair Procedure: Before any concrete is removed, the Engineer shall perform an inspection to determine the exact limits and locations of all areas to be repaired under this item. The Contractor shall provide all scaffolding necessary to carry out this inspection. The limits of each area to be repaired shall be suitably marked.

Loose and deteriorated concrete shall be chipped away back to sound concrete. The exposed surfaces shall be thoroughly sandblasted and vacuumed immediately prior to forming.

Hollow areas in the existing concrete shall be completely exposed by chipping away back to sound concrete and thoroughly sandblasted and vacuumed immediately prior to forming.

Spalled and scaled areas shall be cleaned of all loose deteriorated concrete. The exposed surfaces shall be thoroughly sandblasted and vacuumed immediately prior to forming.

Removal of unsound concrete material shall be such as to facilitate uniform placement of fresh concrete. All upper areas of excavated voids shall slope evenly out to within one inch (1") of the face of the concrete to preclude entrapping air and forming hollow spots in the freshly placed concrete. Within one inch (1") of the surface, the outline shall be essentially normal (perpendicular) to the surface.

In areas where reinforcing steel is found to be surrounded by deteriorated concrete or has at least one-half of its surface area exposed or has less than 1" cover, the depth of removal shall be such as to include all deteriorated concrete but not less than 1" below or behind the reinforcing steel.

All surfaces of exposed concrete and reinforcing steel shall be free of oil, solvent, grease, dirt, dust, bitumen, rust, loose particles and foreign matter. Prior to sandblasting of concrete and steel surfaces, all petroleum contamination on these surfaces shall be removed by appropriate solvent or detergent cleaning operations.

All compressed air equipment used in cleaning shall have properly sized and designed oil separators, attached and functional, to assure the delivery of oil-free air at the nozzle.

Extreme care shall be taken where reinforcing steel is uncovered not to damage the steel or its bond in the surrounding concrete. Pneumatic tools shall not be placed in direct contact with reinforcing steel. Maximum 30 pound size hammers shall be used for general chipping and removal, while maximum 15 pound size shall be used behind reinforcing steel. Exposed reinforcing shall remain in place except where specifically indicated for removal by direction of the Engineer. Exposed reinforcing steel shall be sandblasted in accordance with SSPC-SP-6, Commercial Blast Cleaning, to remove all contaminants, rust and rust scale.

The exposed blast cleaned reinforcing steel shall be coated with the single component zinc primer by brush. All applications of the zinc primer shall be in accordance with the manufacturer's printed instructions.

Where the existing reinforcing steel is severely corroded or damaged, it shall be cut out and replaced with new galvanized reinforcing steel of the same size and spacing. Where existing steel is determined by the Engineer to have insufficient cover, it shall be either replaced or adjusted as directed. New steel shall be attached behind existing steel with a minimum lap splice length in accordance with the requirements for a Class C lap splice per AASHTO or as directed by the Engineer. Concrete shall be removed to a minimum depth of 1" behind the new steel.

When using sandblasting equipment, all work shall be shielded and contained for the protection of the public and the environment.

All excavated areas on vertical surfaces of concrete members shall be formed using forms coated

with a plastic or similar film to preclude the use of form release agents. Forms and support systems shall be properly designed in accordance with Subarticle 6.01.03-3. Forms shall be so designed that placement access shall be allowed at the top of each respective formwork assembly for contiguous void areas.

No bonding materials shall be used before or during the placement of this concrete material. Concrete surfaces against which this material is to be placed shall be sound, tight, and thoroughly roughened by the removal and sandblasting procedures specified above. The exposed concrete surfaces shall be thoroughly wetted with fresh water immediately prior to placement of the fresh concrete by "hosing" down the areas behind the forms as thoroughly as possible. Light rust formations on sandblasted reinforcing steel prior to concrete placement is normal and acceptable.

Placement of the fresh concrete shall be in the maximum height lifts possible under the circumstances and all freshly placed concrete shall be consolidated during placement with adequately sized and effective vibrators.

Following curing and stripping, the exposed faces of new concrete shall be finished off with the use of the appropriate tools to blend in the physical appearance to the surrounding areas as much as possible.

Cured patches shall be sounded by the Engineer to detect the presence of any hollow spots. Such spots shall be removed and replaced by the Contractor at no additional cost to the State.

6.01.4 - Method of Measurement: Add the following:

Class "S" Concrete shall be measured for payment by the actual volume in cubic yards of concrete placed and accepted by the Engineer. Reinforcing steel will not be measured for payment.

6.01.5 - Basis of Payment: Amend as follows:

1. Concrete: Add the following:

Class "S" Concrete will be paid for at the contract unit price, per cubic yard, for "Class "S" Concrete", complete in place, which price shall include providing inspection access, locating and removing unsound material, shielding, sandblasting, cleaning, forming, application of zinc primer coating, galvanized reinforcing steel, galvanized reinforcing steel splices, placing and curing concrete, stripping formwork and finishing new concrete, and all materials, equipment, tools, labor and clean-up incidental thereto.

Pay Item	Pay Unit
Class "S" Concrete	Cubic Yard (CY)

ITEM #0601954A – EPOXY INJECTION CRACK REPAIR

Description: This item shall consist of rebonding the cracked concrete structures with a two component modified epoxy resin system injected into the cracked structure under low pressure using continuous positive displacement metering and mixing equipment as directed in accordance with these specifications. The Contractor shall provide access to all surfaces to be repaired (all foundation surfaces including wingwalls) so that the Engineer can perform the survey and lay out the repairs (including location, length, depth, and cracking type **[**structural or non-structural**]**).

The Contractor shall not perform any repair work without prior approval by the Engineer for locations, limits, and type of repairs.

Materials: The modified epoxy resin shall be a pre-qualified epoxy resin (see Appendix A, attached). A Materials Certificate and a Certificate of Compliance in according with Article 1.06.07 shall accompany each batch or lot of the material delivered to the job site to verify the epoxy resins conformance with the manufacturer's supplied infrared spectroscopy test results. A sample of liquid epoxy resin component A and B shall be taken and shall consist of one pint of each batch of each component represented in each shipment. The samples shall be presented to the Laboratory a minimum of 14 calendar days before incorporation of any of the batch into the work. The Laboratory shall conduct the Infrared Spectroscopy Test on the samples (see Appendix A, attached). Each test result shall be compared to the test results on file with the Laboratory from the "Prequalification Procedures". Two materials are considered to be identical if all of the absorption points agree as to wavelength and relative magnitude of the peaks in comparison with the other points of absorption.

A batch of each component will be defined as that quantity of material that has been subjected to the same unit chemical or physical mixing process intended to make the final product substantially uniform.

Each component shall be packaged in steel containers not larger than 5 gallons in volume. The containers shall have lug type crimp lids with ring seals, shall be new, not less than 0.024-inch nominal thickness, and shall be well sealed to prevent leakage. If a lining is used in the containers it shall be of such character as to resist any action by the components. Each container shall be clearly labeled with the designation (component A or B), manufacturer's name, and date of manufacturer, batch number and the following warning:

CAUTION: This material will cause severe dermatitis if it is allowed to come in contact with the skin or eyes. Use gloves and protective creams on the hands. Should this material contact the skin, wash thoroughly with soap and water. Do not attempt to remove this material from the skin with solvents. If any gets in the eyes, flush for 10 minutes with water and secure immediate medical attention.

Any material, which shows evidence of crystallization or a permanent increase in viscosity or settling of pigments that cannot be readily redispersed with a paddle, shall not be used.

Construction Methods: A survey shall be undertaken by the Contractor on the area designated to be repaired, under the direction and to the satisfaction of the Engineer, to determine the exact limits and location of the area to be repaired under this item.

At the time of mixing, components A and B and the substrate temperature shall be between 50 and 85 degrees Fahrenheit, unless the material has been pre-qualified at a temperature less than 75 degrees Fahrenheit, in which case this lesser temperature shall govern the use of the material.

Any heating of the adhesive components shall be done by application of indirect heat. Immediately prior to filling the tanks of the mixing equipment, each component shall be thoroughly stirred with a paddle. Separate paddles shall be used to stir each component. Cracks less than 0.125 inches in widths shall not be repairs under this item unless directed by the Engineer.

Prior to sealing, the crack shall be cleaned free of dust, silt and any other material, which would impair bond. Cleaning shall be done with oil free compressed air jets or preferably by vacuum cleaning with an industrial vacuum cleaner (such as Black and Decker No. 95 Vackar or equivalent).

Injection ports shall be inserted in the cracks at intervals not less than the thickness of the concrete being injected. At the end of a crack or at a point where the thickness of the crack becomes less than .125 inches, the first port shall be half the distance from this point. The Contractor may use either surface injection ports or insertable injection ports as recommended by the manufacturer of the epoxy.

Drilling of the injection ports shall be done with a hollow drill bit to which vacuum is applied with an industrial vacuum cleaner (such as Black and Decker No. 95 Vackar or equivalent). The drill shall not contact any steel reinforcing or pre-stressing strands or ducts. A pachometer shall be used to locate the embedded steel.

Spacing of the ports shall be such that the injected adhesive will substantially fill the crack without excessive waste. If necessary to meet this requirement, the spacing of the ports shall be revised as approved by the Engineer as the injection process progresses.

The surface of the crack between ports shall be sealed with tape or other temporary surface sealant, which is capable of retaining the epoxy adhesive in the crack during pressure injection, and shall remain in places until the epoxy has hardened. Sealant tape and/or temporary surface sealant shall also be removed and any spillage of epoxy shall also be removed. No clean up or surfaces not generally viewed by the public will be required unless the surface sealant will interfere with subsequent surface treatments.

Epoxy adhesive shall be pumped into the cracks through the injection ports. The pump, hose, injection gun and appurtenances shall properly proportion and mix the epoxy and shall be capable of injecting the epoxy at a sufficient rate and pressure to completely fill all designated cracks. A suitable gasket shall be used on the head of the injection gun to prevent the adhesive from running down the face of the concrete. Pumping pressure shall be kept as low as practicable.

The temperature of the concrete shall not be less than 50 degrees Fahrenheit at the time epoxy is injected, unless the epoxy has been pre-qualified at a lower temperature as hereinbefore provided, in which case the lower temperature shall govern.

For a crack with uniform thickness, the epoxy adhesive shall be forced into the first port at one end of the crack until adhesive runs in substantial quantity from the next adjacent port. The first port shall then be sealed and injection started at the next port. Injection shall then continue from port to port in this manner until the crack is fully injected.

Cracks with non-uniform thickness shall have the epoxy adhesive forced into the port at the widest separation in the crack until adhesive runs in substantial quantity from the two adjacent ports. The first port shall then be sealed and injection started at the adjacent port corresponding to the shortest length of the crack. Injection shall then continue from port to port in this manner until the short side of the crack is fully injected. Then, beginning with the port that is filled with epoxy adhesive but not sealed, injection shall continue from port to port until the crack is fully injected.

For slanting or vertical cracks, pumping shall start at the lower end of the crack. Where approximately vertical and horizontal cracks intersect, the vertical crack below the intersection shall be injected first. The ports shall be sealed by removing the fitting, filling the void with epoxy and covering with tape or surface sealant.

Before starting injection work and at 2-hour intervals during injection work when requested by the Engineer, a 3-fluid ounce sample of mixed epoxy shall be taken from the injection gun.

Should these samples show any evidence of improper proportioning or mixing, injection work shall be suspended until the equipment or procedures are corrected.

Samples obtained above shall be used directly, without further stirring, to make test pieces for the Slant Shear Strength on Dry Concrete. One test piece shall be made at the beginning, middle and end of daily operations. The samples shall be allowed to cure for 7 days in the "Concrete Cylinder Curing Box". On the 7th day the samples shall be removed to the laboratory and tested in accordance with the requirements for Slant Shear Strength (see Appendix A, attached).

Each sample shall be numbered consecutively and dated (with a waterproof marker) and it shall be noted which sample represents which part of the structure.

Technical Advisor: The Contractor shall provide the Engineer with a notarized statement showing a specific record of epoxy injection repairs actually made by the Contractor and/or a specific record of training of his employees in epoxy injection repairs as taught by the manufacturer of the epoxy product. If the statement is not produced or is deemed insufficient by the Engineer, the Contractor shall obtain the services of a Technical Advisor who is employed by the manufacturer of the epoxy resin. The Technical Advisor shall assist the Engineer and the Contractor in the correct use of the injection resin. The Advisor shall be a qualified representative approved by the Engineer, and shall be at the site of the work when the work begins in connection with the epoxy injection, and at such other times as the Engineer may request until completion of this item.

Method of Measurement: This work will be measured for payment by the number of linear feet, which have been designated by the Engineer to be injected and which were subsequently filled with epoxy, shall be measured.

Where cracks are designated for injection on opposite sides of a concrete member and the epoxy adhesive injected on one side penetrates through the members to completely fill the crack on the opposite side, payment will be made for the cracks in both sides as though injection had been performed on both sides, except that no payment will be made for such cracks on the opposite side that were not designated by the Engineer for injection.

Where a crack designated for injection extends around the corner of a concrete member, the length of crack on both faces will be measured for payment.

Basis of Payment: This work will be paid for at the contract unit price per linear foot for "Epoxy Injection Crack Repair", complete in place, which price shall include the work and services described herein, including all preparation, materials, equipment, tools, labor and cleanup incidental thereto.

Pay Item	Pay Unit
Epoxy Injection Crack Repair	L.F.

APPENDIX A

Prequalification Procedure
The Prequalification Procedure shall consist of the following test procedure on the mixed epoxy resin at a temperature of 77 F, unless the Contractor desires to use the material at a lower temperature than 50 F, in which case the lower temperature shall be used to condition the material and test pieces.

TEST: VISCOSITY
Requirements: 900 centipoise max. @20 F (2)
4,000 centipoise max. @any test temperature
Test Method: ASTM D 2393

TEST: GEL TIME (POT LIFE)
Requirement: 4 to 60 minutes
Test Method:
A. Apparatus
1. Unwaxed paper cups, 8 oz., 2¼ inches at base (Dixie Cup No. 4338 or equivalent).
2. Wooden tongue depressor with ends cut square (Puritan No. 705 or equivalent).
3. Stainless steel spatula with blade 6" x 1" and with end cut square.
4. Stopwatch, 1 second or smaller divisions.
5. Balance, 0.1gram divisions.
B. Test Procedure
1. Condition both A and B components to required temperature (±2°F).
2. Measure proper volumes of well-mixed components A and B into an 8-oz. unwaxed cup to yield total mass of 60 (±2.0 grams).
3. Start stopwatch immediately and mix components for 60 seconds, stirring with a wooden tongue decompressor taking care to scrape the sides and bottom of the cup periodically.
4. Place the sample at the required temperature (±2°F) on a wooden bench top, which is free of excessive drafts.
5. Probe the mixture once with the tongue depressor every 30 seconds starting 4 minutes from the time of mixing.
6. The time at which a soft stringy mass forms in the cup is the gel time.

TEST: SLANT SHEAR STRENGTH ON WET CONCRETE
Requirements: 1700 psi min. after 7 days of cure in air at the required temperature (±2°F)

TEST: SLANT SHEAR STRENGTH ON DRY CONCRETE
Requirements: 4500 psi min. after 7 days of cure in air at the required temperature (±2°F)

TEST: SLANT SHEAR STRENGTH

A. Materials

1. Ottawa sand, ASTM C109
2. Portland cement, Type II
3. Water

B. Apparatus

1. Suitable mold to make diagonal concrete mortar blocks with a square base with 2-inch sides and having one diagonal face 2" x 4" starting about ¾-inch above the base. The diagonal faces of two such blocks are bonded together producing a block of dimensions 2" x 2" x 5".

2. Block made from the following composition:

- Ottowa sand, ASTM C109 30.1 lbs.
- Portland cement, Type II 12.1 lbs.
- Water 4.8 lbs.

Cure blocks 28 days in a fog room. Dry and lightly sandblast diagonal faces.

3. Suitable test press.

C. Test Procedure

Condition the components for 4 hours at the required temperature (±2°F). Without entrapping air, stir the separate components for 30 seconds and place the proper volumes of each component on a plate and mix with a spatula for 60 + 5 seconds. Apply a coat approximately 0.010-inch thick to each diagonal surface. Place four ⅛-inch square pieces of shim stock 0.012-inch thick on one block to control final film thickness. Before pressing the coated surface together, leave the blocks so that the coated surfaces are horizontal until the epoxy reacts slightly to prevent excessive flow. Press diagonal surfaces of each block together by hand and remove excess epoxy adhesive.

Align the blocks so that the ends and sides are square and form a block 2" x 2" x 5". Use blocks of wood or metal against each 2" x 2" end, to keep diagonal faces from slipping until epoxy hardens.

After the required cure time, apply a suitable capping compound to each of the 2" x 2" bases, and test by applying a compression load with a Universal Test Machine or other suitable testing apparatus at the rate of 5000 lbs./min, until failure.

Report results in pounds per square inch = Load in Pounds/4

For wet shear strength, soak another set of blocks in water for 24 hours at the required temperature (±2°F). Remove and wipe off excess water. Prepare, cure, and test sample according to above test procedure.

TEST: TENSILE STRENGTH
Requirements: 4500 psi Min.

TEST: ELONGATION
Requirements: 15% Max.
Test Method: TENSILE STRENGTH AND ELOGATION

A. Apparatus
1. Leveling table about 12" x 8" with removable rim ¼-inch thick by ½-inch wide.
2. Mylar or similar plastic sheeting 0.004-inches thick.
3. Air circulation oven capable of maintaining 158°F (±3°F).
4. Cutting die, Figure I
5. Thickness gauge, ⅛-inch.
6. Release agent, non-silicone type.

B. Procedure
1. Place Mylar sheet on leveling table.
2. Coat inside edge and bottom of rim with the release agent and secure to table with screws.
3. Level the table.
4. Mix sufficient volume of well-mixed component A and well mixed component B in the proper volumes so as to be able to form a layer ⅛-inch deep when placed inside the ring on the leveling table.
5. Introduce as few bubbles as possible during mixing.
6. Flush surface of epoxy with a heat gun or Bunsen burner to remove air bubbles on surface. Repeat if necessary.
7. Allow the specimen to cure for 18 hours at the required temperature (±2°F).
8. Remove specimen from table and strip off Mylar sheet. Cure specimen for 5 hours at 158°F (±3°F).
9. Allow specimen to cool to the required temperature and cut specimens using cutting die shown in Figure I.
10. Proceed as specified in ASTM D 638, using 0.2-inches/minute test rate and 1-inch gauge length.

TEST: INFRARED SPECTROSCOPY
Requirement: Infrared Spectroscopy Tests shall be obtained of Components A and B
Test Method: RECORDING SPECTROPHOTOMETER

A. Apparatus
1. Perkin–Elmer Model 137-B Infracord Spectrophotometer, automatic recording system from 2.5 microns to 15 microns with a two-speed recorder. Comparable results can be obtained with similar resolution.
2. Disk holder for a one-inch diameter disk.
3. Two sodium chloride crystal disks one-inch in diameter.

4. Sorvall SS-3 Automatic Superspeed Centrifuge, or comparable centrifuge, which is able to separate the liquid and solid phases of the epoxy components without previous dilution with solvents.

B. Procedure
1. Place about 15 grams of component A into a stainless steel centrifuge table.
2. Counterbalance with component B in a second centrifuge tube.
3. Centrifuge the two components at 17000 rpm until there is a supernatant liquid layer present in each tube. This takes 20 to 30 minutes.
4. Place a drop of component A liquid layer on a sodium chloride disk.
5. Place another sodium chloride disk over the drop, rotate, and press down until the liquid has flowed into a uniform layer of proper thickness between the two sodium chloride disks.
6. Place the disks in the holder and run an absorption curve with the infrared spectrophotometer.
7. More or less liquid may be used between the disks so as to produce a maximum absorption of 0.7 to 1.0 for the strongest absorption point on the curve.
8. Clean the disks with toluene and dry.
9. Repeat steps 4 through 8 with the liquid layer from component B.
10. Record each curve in order that they may be used for comparison purposes with lots of material delivered to the job site.

ITEM #0913014A – 5’ CHAIN LINK FENCE (BRIDGE)

ITEM #0913955A – PROTECTIVE FENCE (7’ HIGH) (CURVED)

Description: Work under this item shall consist of furnishing and installing a 5’protective chain link fence, and a 7’ protective chain link fence with a curved top, mounted on top of the parapet, in accordance with the details shown on the plans and in conformance with these specifications or as directed by the Engineer in the field.

Materials: Materials for this work shall be as specified on the plans and shall conform to the applicable requirements of Article M.10.05 of the Department Standard Specification.

The metal posts and rails shall conform to the requirements of ASTM A53, Types E or S Grade B.

Steel base plates shall conform to the requirements of ASTM A36. Stainless steel anchor bolts, nuts and washers shall conform to the requirements of ASTM F593, Group 2, Alloy 316.

All components shall be polyvinyl chloride coated except for the anchor bolts, nuts and washers. The color of the coating shall be black.

Molded pads shall be manufactured from new unvulcanized elastomer and unused synthetic fibers, with a weight proportion of fiber content equal to approximately 1/2 of the total weight of the pad. The pads shall be formed into single sheets of 1/8 inch minimum thickness, with a tolerance of 10%, plus or minus. Pads shall have a Shore A Durometer hardness within the range of 70 to 90, and shall have a minimum compressive breakdown stress of 7000 psi.

Construction Methods: The Contractor shall submit shop drawings to the Engineer for review and approval prior to beginning installation. Shop drawings shall include but not be limited to the following information: a layout plan showing all post spacings and parapet joints (expansion and paraffin), all fence and attachment details, Contractor designed access panels, materials list, and material designations. The access panels shall be located such that the handholes in the light standard bases are easily accessible from the sidewalk in front of the light standard: same elevation as the light standard handholes, minimum clear opening shall be 8”Wx10”H, and the opening shall not have any snag points (i.e. cut fencing links, saw cut burrs, etc.). The access panel shall be vandal resistant and secured shut (i.e. with vandal proof screws/bolts) to the satisfaction of the Engineer.

All welding shall conform to the applicable requirements of Subarticle 6.03.03-4e of the Department’s Standard Specification. Welding shall be performed prior to coating with Polyvinyl Chloride Plastic.

Posts shall be located along the parapet as indicated on the approved shop drawings. A durable template shall be used to accurately position the drilled holes for anchor bolts. The diameter of the holes shall be as specified by the chemical anchor Manufacturer.

Molded pads shall be installed between all base plates and the top of the concrete parapet.

All panels shall be braced with horizontal rails. Rails shall be securely fastened to the post by connection clamps, as shown on the plans. Tension wires shall be located within the curved panel portion, as shown on the plans.

The fabric shall be stretched between posts and secured with stretcher bar bands. The fabric shall be fastened to intermediate posts and rails with PVC coated wire as indicated on the plans. Hog ring shall be used to secure the fabric to the tension wires.

Method of Measurement: This work shall be measured for payment by the number of linear feet of completed and accepted protective fence measured from outside to outside of terminal (end) posts.

Basis of Payment: This work will be paid for at the contract unit price, per linear foot for, 5' Chain Link Fence " or "Protective Fence (7' High) (Curved)", complete in place, which price shall include all materials, equipment, tools and labor incidental thereto, including providing and installing the anchor bolts in the top of the parapet.

Pay Item	Pay Unit
5' Chain Link Fence (Bridge)	L.F.
Protective Fence (7' High) (Curved)	L.F.